STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
PACIFIC CASCADE REGION

COW TOWN

ROAD PLAN

SECTION 36, TOWNSHIP 6 NORTH, RANGE 2 E ST, W.M.
SECTION 31, TOWNSHIP 6 NORTH, RANGE 3 E ST, W.M.

CLARK COUNTY

YACOLT DISTRICT

AGREEMENT NO.: 30-076299

CONTRACT ADMINISTRATOR: Marc Ratcliff

DATE: 05/01/2004

STAFF ENGINEER: Jim English

DRAWN & COMPILED BY: Alicia Compton

SECTION 0 – SCOPE OF PROJECT

This project includes but is not limited to optional construction including:

clearing;
grubbing;
right-of-way debris disposal;
excavation and/or embankment to subgrade;
landing construction;
acquisition and installation of drainage structures;
acquisition, manufacture, and application of rock;
road deactivation;
grass seeding.

This project also includes but is not limited to optional reconstruction including:

right-of-way debris disposal;
pulling ditches;
cleaning ditches;
road deactivation;
grass seeding.

This project also includes but is not limited to abandonment including:

medium abandonment.

SECTION 1 - GENERAL CLAUSES

1.1-1

Clauses in this plan apply to all construction, reconstruction, or abandonment including landings unless otherwise noted.

1.1-3

Construction and reconstruction of the following roads is not required. Roads used by the Purchaser shall be constructed on the State's location and in accordance with this Road Plan.

Road	Stations	Type
GM-1100A	0+00 to 13+60	Construction
Spur A	0+00 to 6+17	Reconstruction
	6+17 to 18+46	Construction

1.1-4

If the Purchaser desires a road location or design change, a revised Road Plan shall be submitted to the State for consideration.

1.1-5

On this plan quantities are minimum acceptable values. Additional quantities required by the State because of hidden conditions or Purchaser's choice of construction season or techniques shall be at the Purchaser's expense. Hidden conditions include, but are not limited to: solid subsurface rock, subsurface springs, saturated ground, and unstable soil.

1.2-1

The construction, reconstruction, or abandonment of any roads specified herein shall not be permitted between November 1 and April 15 unless authority to do so is granted, in writing, by the Contract Administrator.

1.2-2

Purchaser shall not use roads constructed or reconstructed under this Road Plan for hauling, other than timber cut on the right-of-way, without written approval from the Contract Administrator.

1.2-6

Pioneering shall not extend past construction that will be completed during the current construction season. Drainage shall be provided on all uncompleted construction as approved, in writing, by the Contract Administrator.

Culverts shall be installed in completed subgrade as construction progresses.

Subgrade, ditches, and culvert installations shall be completed and are subject to written approval by the Contract Administrator prior to rock application, and/or timber haul.

1.4-3

Reference points (R.P.'s) that are moved or damaged at any time during construction shall be reset in their original locations by the Purchaser. Excavation and embankment shall not proceed on road segments controlled by said R.P.'s until all moved or damaged R.P.'s are reset.

1.5-1

Maintenance on roads listed in Contract Clauses C-50 (Purchaser Road Maintenance and Repair) and C-60 (Designated Road Maintainer) shall be performed in accordance with Forest Access Road Maintenance Specifications.

1.5-3

On all roads, Snowplowing shall not be permitted unless authorized, in writing, by the Contract Administrator.

SECTION 2 - CLEARING

2.1-1

Fell all vegetative material larger than 6 inches DBH or over 20 feet high between the marked right-of-way boundaries and within waste areas or if not marked in the field, between clearing limits specified on TYPICAL SECTION SHEET.

SECTION 3 – GRUBBING

3-1

All stumps shall be removed that fall between grubbing limits shown on the TYPICAL SECTION SHEET. Those outside the grubbing limits but with undercut roots shall also be removed. Stumps over 22 inches diameter shall be split. Stumps over 40 inches shall be quartered.

3-2

Grubbing limits are defined as the entire area between the external limits shown on the TYPICAL SECTION SHEET.

3-3

On the following road, removal of stumps shall not be required, provided that they are cut flush with the ground.

Road	Stations
Spur A	6+17 to 18+46

SECTION 4 - DEBRIS DISPOSAL AND REMOVAL

4.1-1

Right-of-way debris is defined as all vegetative material larger than one cubic foot in volume within the clearing limits.

4.1-2

All right-of-way debris disposal shall be completed prior to the application of rock and/or timber haul.

4.2.3-2

Right-of-way debris shall not be placed against standing timber.

SECTION 5 - EXCAVATION

5.1-1

Unless controlled by construction stakes or specific design sheets herein, roads shall be constructed or reconstructed in accordance with dimensions shown on the TYPICAL SECTION SHEET.

5.1-3

Road grade and alignment shall conform to the State's marked location. Grade and alignment shall have smooth continuity without abrupt changes in direction. Maximum grades are 18 percent favorable and 12 percent adverse or as specified on drawings. Minimum radius curve is 60 feet.

5.1-5

Curve widening, where required, shall be added to the inside of curves.

5.1-7

Roads shall be constructed or reconstructed to the dimensions shown on the TYPICAL SECTION SHEET, within the tolerance listed below. Tolerance classes for each road are listed on the TYPICAL SECTION SHEET.

Tolerance Class	A	B	C
Road Width (feet)	+1.5	+1.5	+2.0
Subgrade elevation (feet +/-)	0.5	1.0	2.0
Centerline alignment (feet lt./rt.)	1.0	1.5	3.0

5.1-8

Excavation slopes shall be constructed no steeper than shown on the following table except as construction staked or designed:

Material Type	Excavation Slope Ratio
Common Earth (on side slopes of 55%)	1:1
Common Earth (55% to 70% sideslopes)	¾:1
Common Earth (on slopes over 70%)	½:1
Fractured or loose rock	½:1
Hardpan or solid rock	¼:1

5.1-9

Excavation and embankment slopes shall be constructed to a uniform line and left rough for easier revegetation.

5.1-10

Embankments shall be widened as follows:

Height at Centerline	Subgrade Widening
Less than 6 feet	2 feet
6 feet or over	4 feet

5.1-11

Embankment slopes shall be constructed no steeper than shown on the following table:

Material Type	Embankment Slope Ratio
Common Earth and Rounded Gravel	1½:1
Angular Rock	1¼:1
Sandy Soils	2:1

5.1-12

Organic material shall be excluded from embankment as shown on the TYPICAL SECTION SHEET and from waste material deposited on slopes in excess of 40 percent.

5.1-14

Where side slopes exceed 45 percent, full bench construction shall be utilized for the entire subgrade width.

5.1-17

Turnouts shall be intervisible with a maximum of 1,000 feet between turnouts unless shown otherwise on drawings.

5.1.1-2

Waste material shall not be deposited within 100 feet of a live stream.

5.1.1-3

Waste material may be deposited adjacent to the road prism on side slopes up to 45 percent if the waste material is compacted and more than 100 feet away from live streams. On side slopes of 45 percent or more, all excavation shall be end hauled or pushed to designated embankment sites. All waste embankments shall be compacted in horizontal layers not exceeding 2 feet.

5.2-1

Road pioneering operations shall not undercut the final cut slope, deposit excavated material outside the clearing limits, or restrict drainage.

5.3-1

All embankment and waste material shall be compacted. The minimum acceptable compaction is achieved by placing embankments in 2 foot or shallower lifts and routing excavation equipment over entire width of the lifts. Side hill embankments too narrow to accommodate excavation equipment may be placed by end-dumping or side casting until sufficiently wide to support the equipment.

5.4-1

Silt-bearing runoff shall not be permitted to go into streams.

5.4-3.1

Purchaser shall furnish and evenly spread the seed mixture listed below on all exposed soil inside the grubbing limits at a rate of 40 pounds per acre. The date of application is subject to approval by the Contract Administrator.

Mixture Percent by Weight	Minimum Percent Germination
50% Fescue, Red	90% Germination
25% Ryegrass, Perennial	90% Germination
15% Bentgrass	85% Germination
10% Clover, White and White Dutch (inoculated)	90% Germination

Weed seed shall not exceed 0.5% by weight.

Fertilizer shall be applied at a rate of 100 lbs per acre, and shall consist of 16-16-16 or other approved balanced mix.

Seed shall be furnished in standard containers on which the following shall be shown:
1. Common name of seed
2. Net weight
3. Percent of purity
4. Percentage of germination
5. Percentage of weed seed and inert material

Required seed not spread by the termination of this contract shall become property of the State. The amount owed to the State shall be as follows, less the amount spread.

Road	Stations	Seed Quantity (lbs)
GM-1100A	0+00 to 13+60	50
Spur A	0+00 to 18+46	68

5.5-5

Finished subgrade shall be crowned as shown on the TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner.

SECTION 6 - DRAINAGE

6.2.1-1

Purchaser shall furnish, install, and maintain galvanized culverts AASHTO Specification No. M-36 corrugated polyethylene pipe (AASHTO specification No. M-294 Type S) and on culverts over 24 inches, aluminized culverts (meeting ASTM A 819, AASHTO M-274 aluminized steel Type 2 and AASHTO M-36 specifications) as designated on the CULVERT LIST. Culvert and flume lengths shall be varied to fit as-built conditions subject to written approval by the Contract Administrator.

6.2.1-2

Annular corrugated bands and culvert ends shall be used on metal culverts. On culverts 24 inches and smaller, bands shall have a minimum width of 12 inches, on culverts over 24 inches, bands shall have a minimum width of 24 inches. Manufacturer's approved connectors shall be used for corrugated polyethylene pipe.

6.2.2.1-1

Culvert, downspout, flume, and energy dissipater installation shall be in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL

6.2.2.3-1

Cross drains and surface culverts on road grades in excess of 3% shall be skewed at least 30 degrees from perpendicular to the road centerline , except that cross drain culverts at the low points of dips in roads shall not be skewed.

6.2.2.3-2

Cross drain culverts shall be installed at a slope steeper than the incoming ditch grade, but not less than 3% nor more than 10%.

6.2.2.4-1

Installations of culverts 36 inches in diameter and over shall be subject to written approval by the Contract Administrator or prior to making backfill.

6.2.2.5-1

Drainage structure outfalls shall not terminate directly on unprotected soil that will erode. Downspouts, flumes, and energy dissipators shall be installed to prevent erosion.

6.3-1

Ditches shall be constructed concurrently with construction of the subgrade. Ditches shall drain to culverts, ditchouts, and natural drainages.

6.3-2

On the following roads, re-shaping and constructing and cleaning the ditchline, culvert headwalls, and catch basins and outlets shall be completed prior to timber haul and shall be done in accordance with the TYPICAL SECTION SHEET.

Road	Stations
Spur A	0+00 to 6+17

6.5-1

Headwalls shall be constructed in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL at all cross drain culverts except for temporary culverts.

SECTION 7 - ROCK

7.1-1

Rock for construction and/or reconstruction under this contract may be obtained from a source/s on State land as listed below at no charge to the Purchaser. Development and use shall be in accordance with a written "Development Plan" prepared by the State. A copy of the written plan is available upon request from the Pacific Cascade Region office. Upon completion of operations, the rock source shall be left in the condition specified in said plan, subject to approval by the Contract Administrator. Use of material from any other source must have prior written approval from the Contract Administrator. If other operators are using or desire to use this rock source, a joint operating plan shall be developed. All parties shall follow this plan.

Source	Location
GM-1200 ROCK PIT	SE ¼ of Section 31, T6N R03E, W.M.

7.4.2-10

Each lift of rock shall be crowned as shown on TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner and accordance with the quantities shown on the ROCK LIST.

SECTION 8 – STRUCTURES

8.4-2

On the following roads, Purchaser shall replace or repair existing gate in kind.

Road	Stations
GM-1000 / GM-1100	Junction

SECTION 10 - ROAD AND LANDING ABANDONMENT

10.1-1

The following roads shall be abandoned by the Purchaser at the termination of use within 30 days following completion of timber harvest removal prior to the termination of this contract and according to the ROAD ABANDONMENT CROSS SECTIONS DETAIL.

Road	Stations	Type
GM-1100A	0+00 to 13+60	Medium
Spur A	0+00 to 18+46	Medium

10.1-3

Medium Abandonment shall consist of:

work shall be performed between April 15 and November 1;
filling the ditches;
ripping the surface to a minimum depth of 10 inches;
outsloping the surface at a minimum of 30%;
removing embankments, sidecast fill, and placing material into cutbanks and shaping banks to conform with natural ground;
constructing non-drivable water bars, as directed by Contract Administrator, in conformance with the attached NON-DRIVABLE WATER BAR DETAIL at a maximum spacing which will produce a vertical drop of no more than 10 feet between water bars or between natural drainage paths and with a maximum spacing of 100 feet; or as marked in the field;
skewing water bars at least 30 degrees from perpendicular to the road centerline on roads in excess of 3% grade;
keying water bars into ditchline;
construction of tank trap barriers in conformance with the attached "T" TANK TRAP DETAIL;
removing culverts from State Land, with the exception of the culvert at Station 1+82 Spur A;
removing ditch cross drain culverts and leaving the resulting trench open;
sloping all trench walls and approach embankments no steeper than 1.5:1;
grass seeding concurrently with abandonment and in accordance with Clause: 5.4-3A;
covering, concurrently with abandonment, all exposed soils within 100 feet of any live stream, with a 6 inch deep layer of straw.

10.1-7

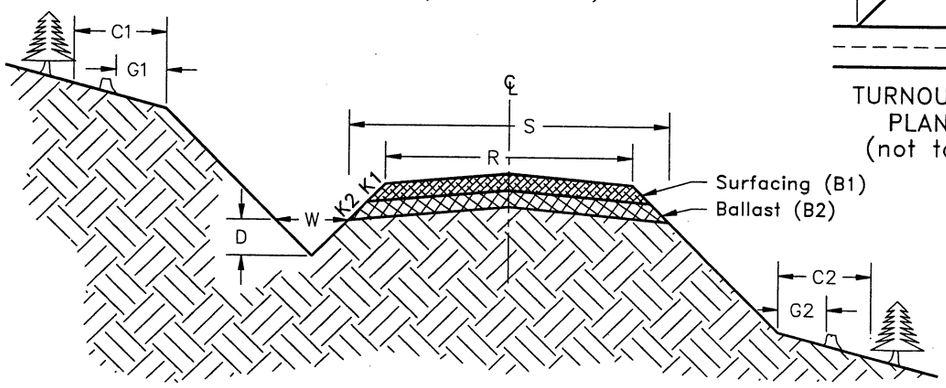
On the following road, Purchaser shall remove existing culverts from live streams and leave the resulting trench open with excavation slopes and trench bottom as specified. The trench bottom shall conform to natural stream profile. Excavated material shall be placed in the waste area approved in writing by the Contract Administrator. Culvert removal from live streams shall be in accordance with the Hydraulic Project Approval, FILL REMOVAL DETAIL, SETTLING POND AND PUMP DETAIL, and the CULVERT REMOVAL DETAIL.

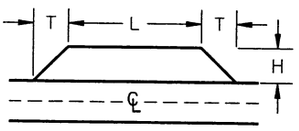
Road	Stations	Waste Area
Spur A	1+82	Existing Road

If the culvert after removal is undamaged (usable condition), it can remain on state land, if damaged and in unusable condition it must be removed from State Land.

TYPICAL SECTION SHEET

ROAD CROSS-SECTION
(not to scale)

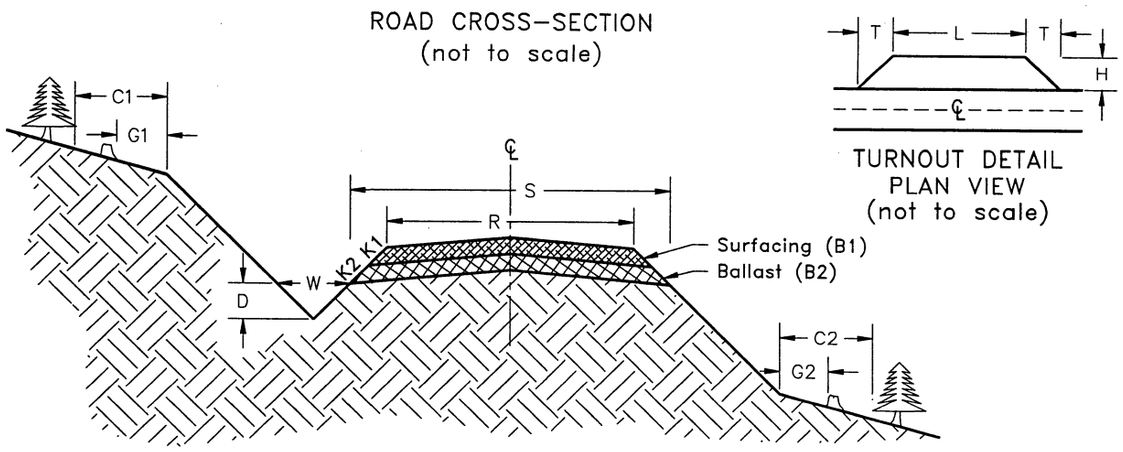




TURNOUT DETAIL
PLAN VIEW
(not to scale)

Road Number	From Station	To Station	Tolerance Class	Subgrade Width	Road Width	Ditch		Crown in. @ CL	Grubbing Limits		Clearing Limits	
						Width	Depth					
				S	R	W	D		G1	G2	C1	C2
GM-1100A	0+00	13+60	C	16'	10'	2'	1'	4"	-	-	10'	10'
Spur A	0+00	18+46	C	16'	10'	2'	1'	4"	-	-	10'	10'

ROCK LIST



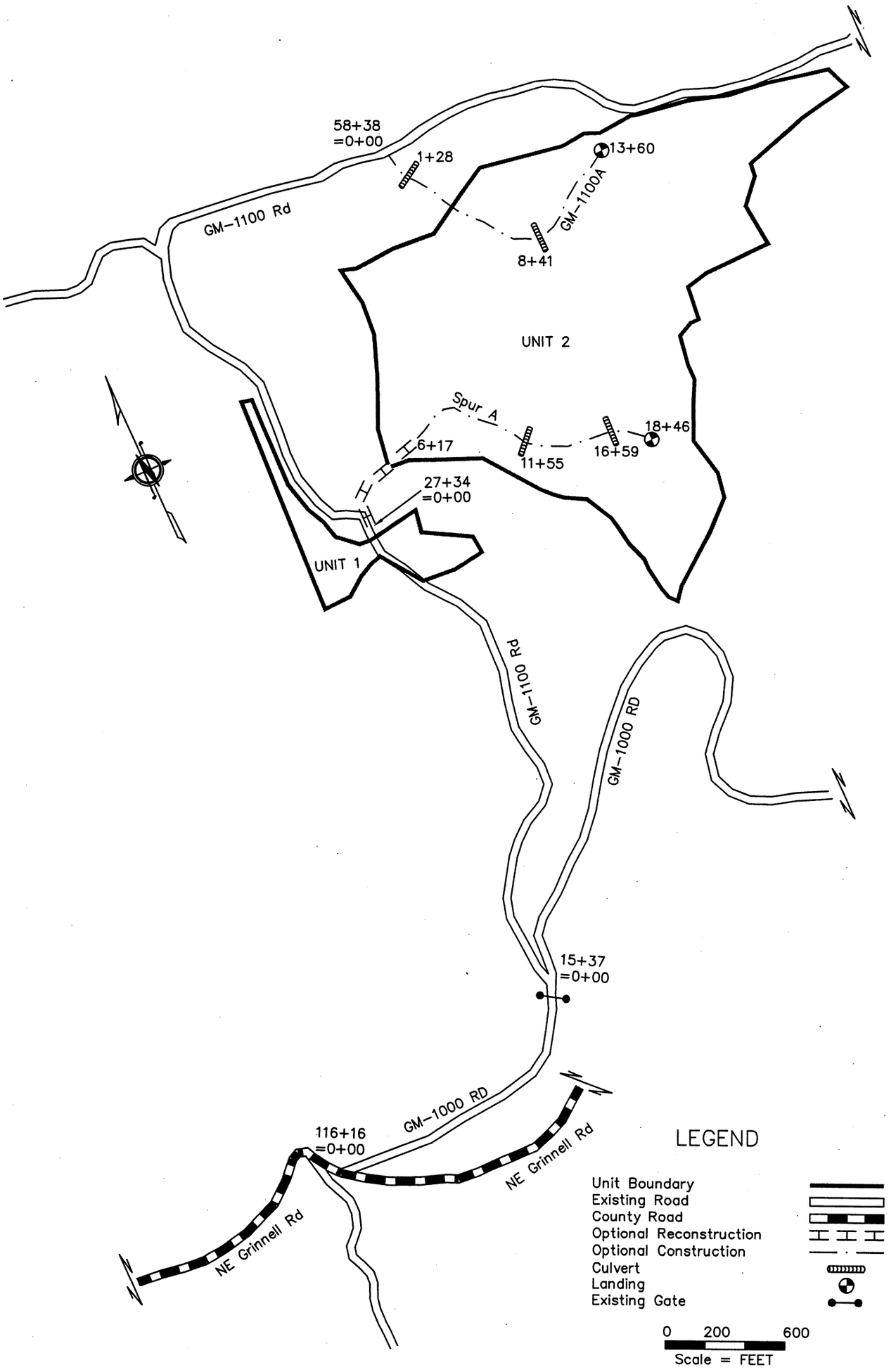
BALLAST

Road Number	From Station	To Station	Rock Slope	Compacted Rock Depth	C.Y./ Station	# of Stations	C.Y. Subtotal	Rock Source	Turnout		
									Length	Width	Taper
			K2	B2					L	H	T
GM-1100A	0+00	13+60	1:1	12"	50	13.6	680	GM 1200 Rock Pit			
Spur A	0+00	18+46	1:1	12"	50	12.29	615				
	Turnout (1)		1:1	12"	50	1.00	50		50	10	50
	Landings (2)		1:1	12"	75	3.00	225				

BALLAST TOTAL 1,570 Cubic Yards

COW TOWN

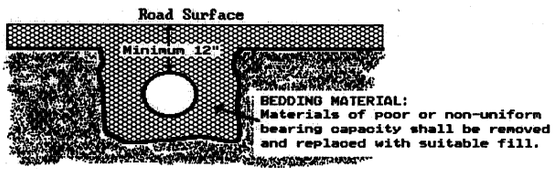
ROAD PLAN MAP



CULVERT LIST

Road Number	Location	Culvert Dia.	Culvert Gauge	Length (ft) Culvert	Downspt	Flume	Riprap (C.Y.) Inlet	Outlet	Type	Backfill Material	Placement Method	Const. Staked	Remarks
			If Steel										
GM-1100A	1+28	18"	16	30	-	-	-	-	-	-	-	-	
	8+41	18"	16	30	-	-	-	-	-	-	-	-	
Spur A	11+55	18"	16	30	-	-	-	-	-	-	-	-	
	16+59	18"	16	30	-	-	-	-	-	-	-	-	

CULVERT BACKFILL AND BASE PREPARATION
(For culverts less than 36")

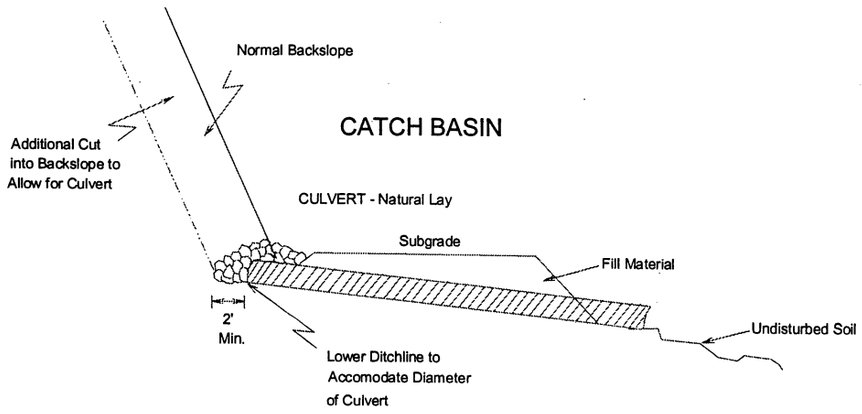


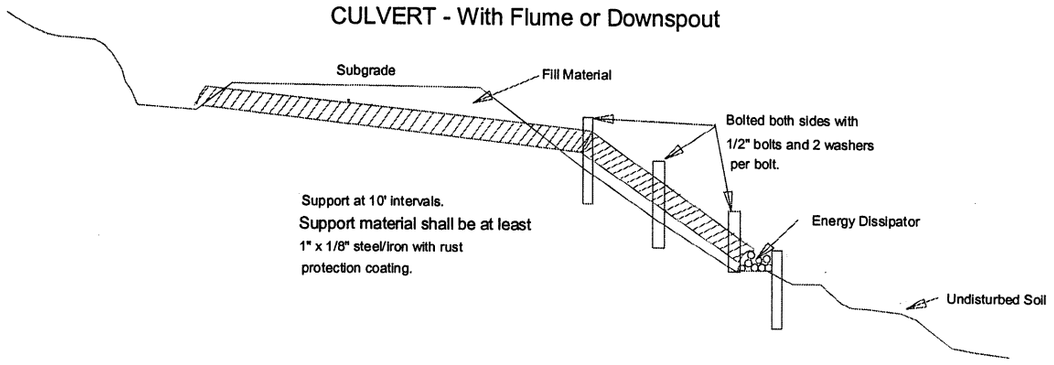
Key:

SR - Shot Rock
NT - Native (bank run)
SL - Select Fill
HL - Heavy Loose Riprap
LL - Light Loose Riprap
Flume - Half round pipe
Downspout - Full round pipe

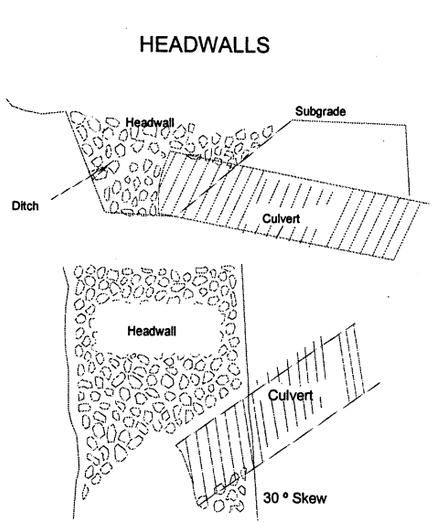
CULVERT AND DRAINAGE SPECIFICATION DETAIL

(Page 1 of 2)

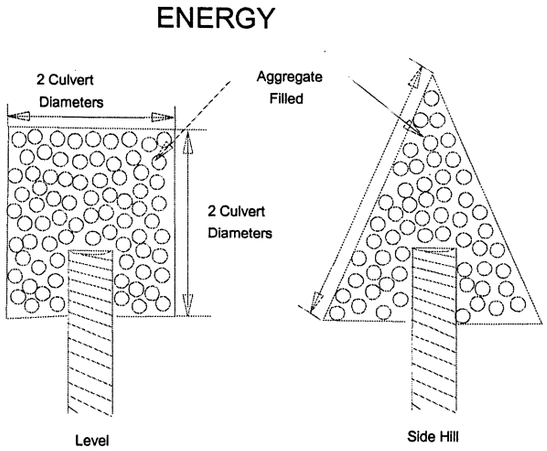




Proper preparation of foundation and placement of bedding material shall precede the installation of all culvert pipe. This includes necessary leveling of the native trench bottom and compaction of required bedding material to form a uniform dense unyielding base. The backfill material shall be placed so that the pipe is uniformly supported along the barrel.



Headwalls to be constructed of material that will resist erosion.



Dissipator Specifications:
Depth: 1 culvert diameter
Aggregate: as specified in the CULVERT LIST.

CULVERT AND DRAINAGE SPECIFICATION DETAIL

(Page 2 of 2)

POLYETHYLENE PIPE INSTALLATION

INSTALLATION REQUIREMENTS:

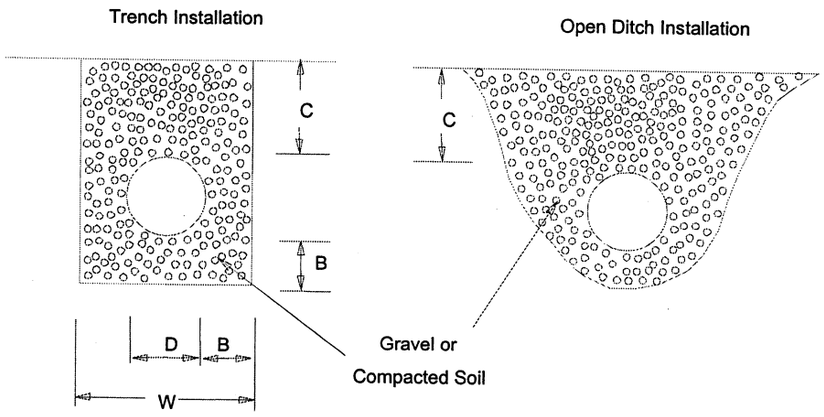
1. Crushed stone, gravel, or compacted soil backfill material shall be used as the bedding and envelope material around the culvert. The aggregate size shall not exceed 1/6 pipe diameter or 4" diameter, whichever is smaller.

2. The corrugated pipe shall be laid on grade, on a layer of bedding material as shown for the two types of installations. If native soil is used as the bedding and backfill material, it shall be well compacted in six inch layers under the haunches, around the sides and above the pipe to the recommended minimum height of cover.

3. Either crushed aggregate or flexible (asphalt) pavement may be laid as part of the minimum cover requirements.

4. Site conditions and availability of bedding materials often dictate the type of installation method used.

5. The load bearing capability of flexible conduits is dependent on the type of backfill material used and the degree of compaction achieved. Crushed stone and gravel backfill materials typically reach a compaction level of 90-95% AASHTO standard density without compaction. When native soils are used as backfill material, a compaction level of 85% is required. This minimum compaction can be achieved by either hand or mechanical tamping.



MINIMUM DIMENSIONS
Trench or Open Ditch Installation

Nominal Diameter	Minimum Thickness	Minimum Cover	Min. Trench Width
D	B	C	W
18"	6"	12"	36"
24"	6"	12"	42"
30"	6"	12"	48"
36"	6"	12"	54"

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

FOREST ACCESS ROAD
MAINTENANCE SPECIFICATIONS

1. CONSTRUCTION AND RECONSTRUCTION (Prior to acceptance to the contract or acceptance on a timber sale).

A. Cuts and Fills
   1. Maintain slope lines as constructed. Remove slides from the ditches and roadway. Replace fills to 1½:1 slopes with selected material or as directed. Remove overhanging material from the cut slopes.
   2. Material from slides or other sources requiring removal shall not be deposited in streams or at locations where it will erode into streams or water courses.
   3. Undesirable slide materials and debris shall not be mixed into the surface material.

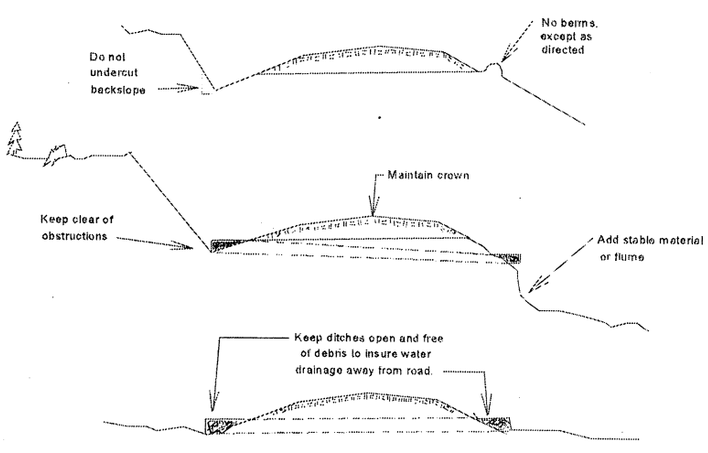
B. Surface
   1. Grade and shape the road surface, turnouts, and shoulders to the original crown, inslope or outslope as directed to provide suitable traveled surface and surface water runoff in an even, unconcentrated manner.
   2. Blading must not undercut the backslope at the bottom of the ditchline or cut geotextile at centerline.
   3. Watering may be required to control dust and to retain fine surface rock.
   4. Desirable surface material shall not be bladed off the roadway.
   5. Replace surface material lost or worn away.
   6. Remove berms except as directed by the State.
   7. Barrel spread soft spots to prevent degradation of geotextile.

C. Drainage
   1. Keep ditches and drainage channels at outlets and inlets of culverts clear of obstructions and functioning as intended.
   2. Inspect and clean culverts at least monthly, with additional inspections during storms and periods of high runoff. This must be done even during periods of inactivity.
   3. Add stable material at the outlet end of the culvert as needed to stabilize the stream bed.
   4. Headwalls: maintain to the road shoulder level with material that will resist erosion.
   5. Keep silt bearing surface runoff from getting into live streams.

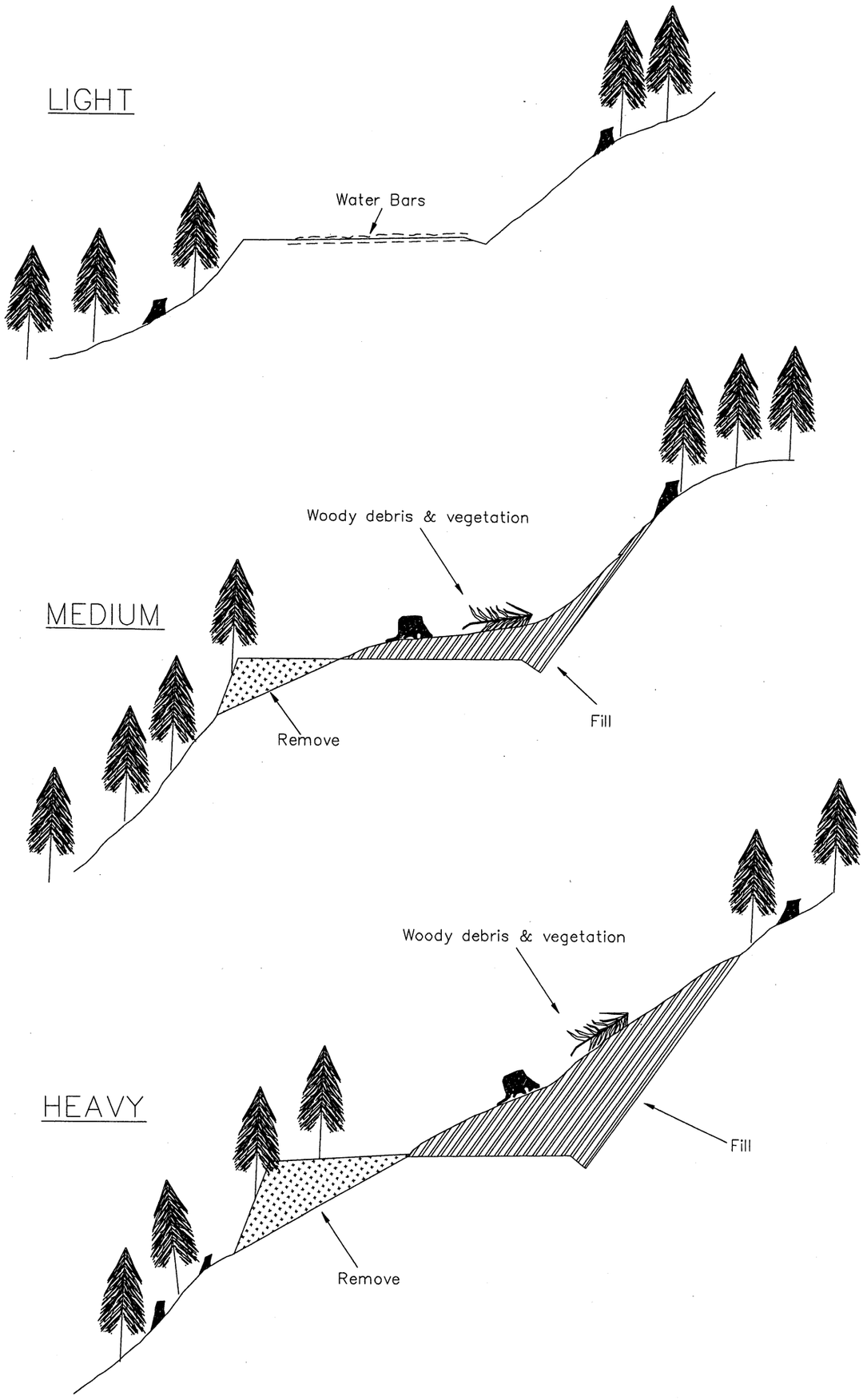
D. Structures
   Repair bridges, culverts, cattleguards, fences, and other road structures to the condition required by the construction specifications.

E. Termination of Use or End of Season
   Do maintenance work to minimize damage from the elements such as blading to insure correct runoff, ditch, and culvert cleaning and water bars.

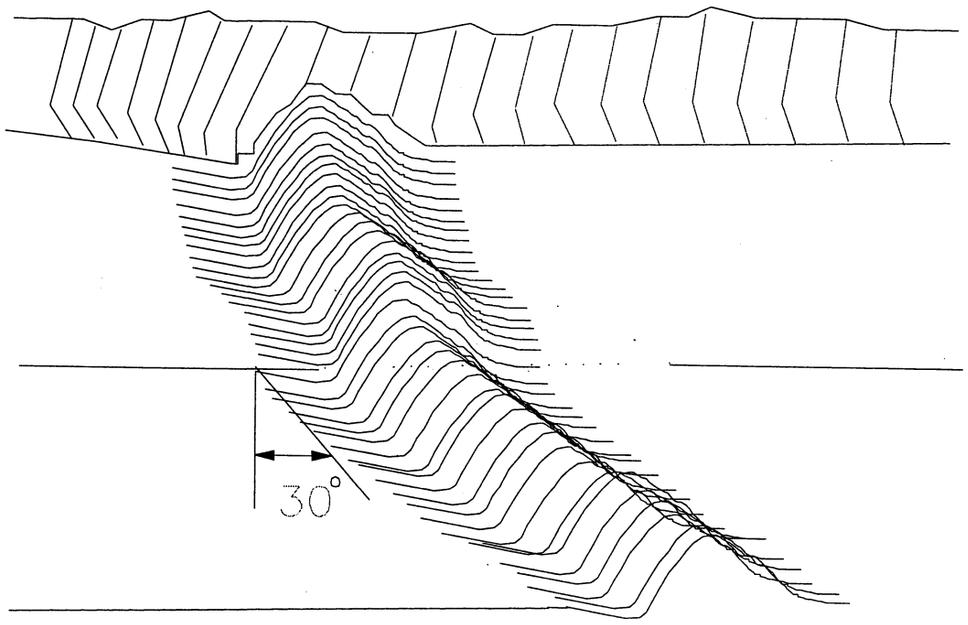
F. Debris
   Remove fallen timber, limbs, and stumps from the slopes or roadway.

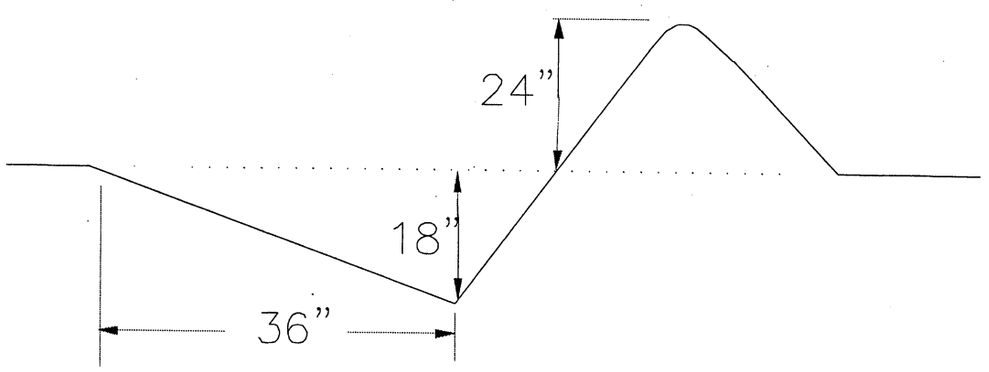


ROAD ABANDONMENT CROSS SECTIONS

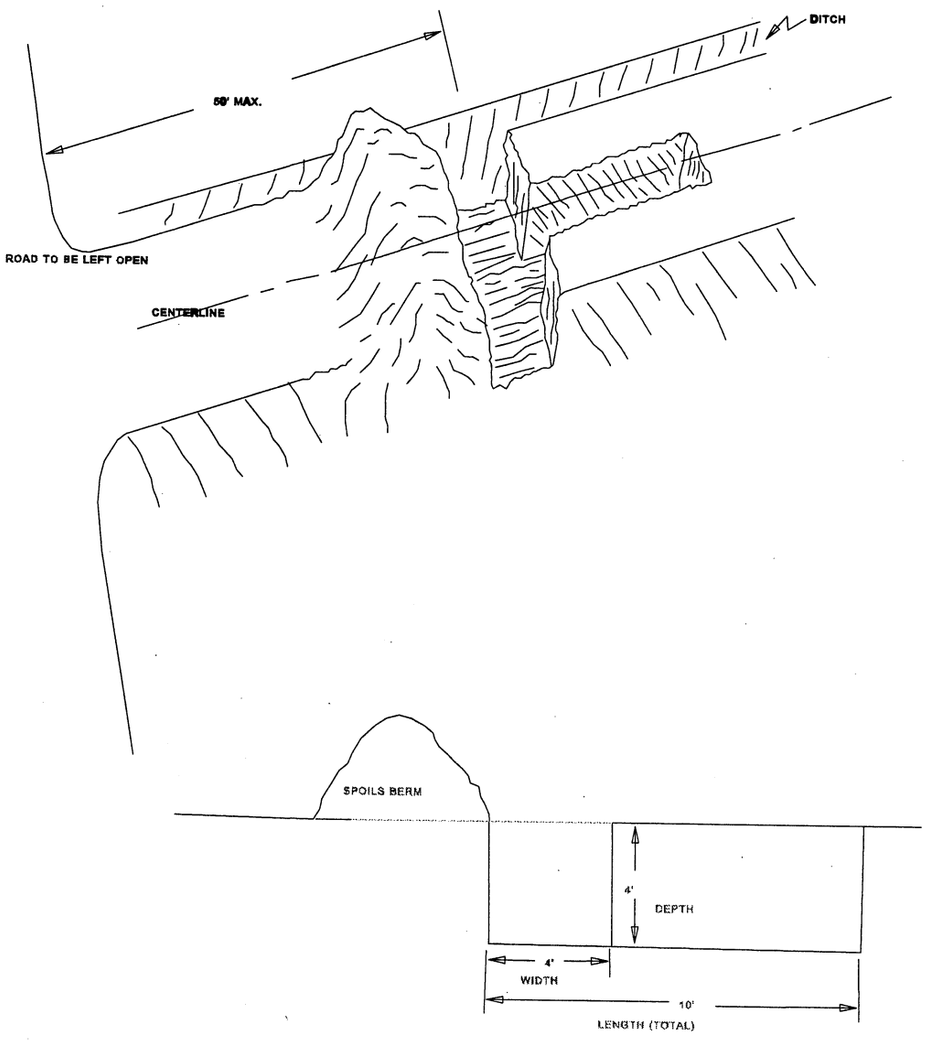


NON-DRIVABLE WATER BAR DETAIL

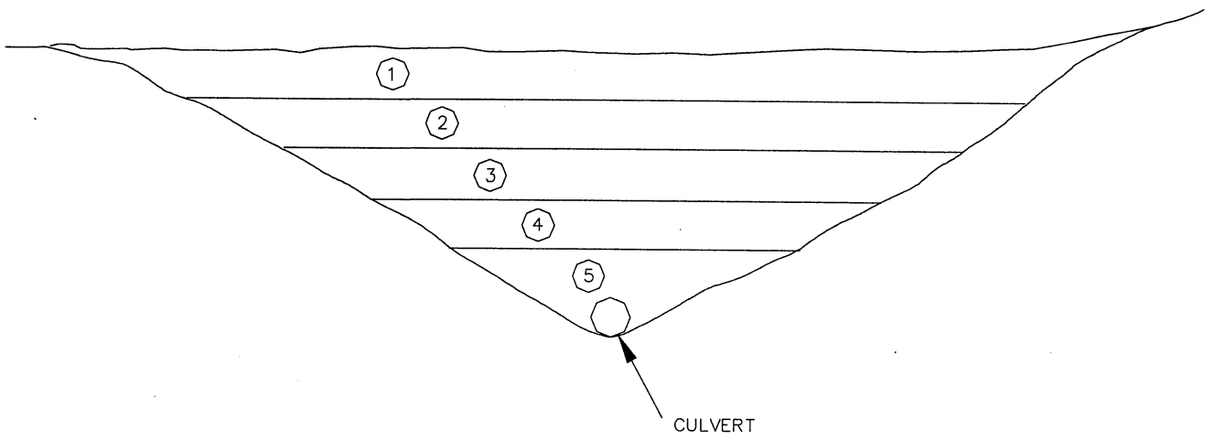




"T" TANK TRAP DETAIL

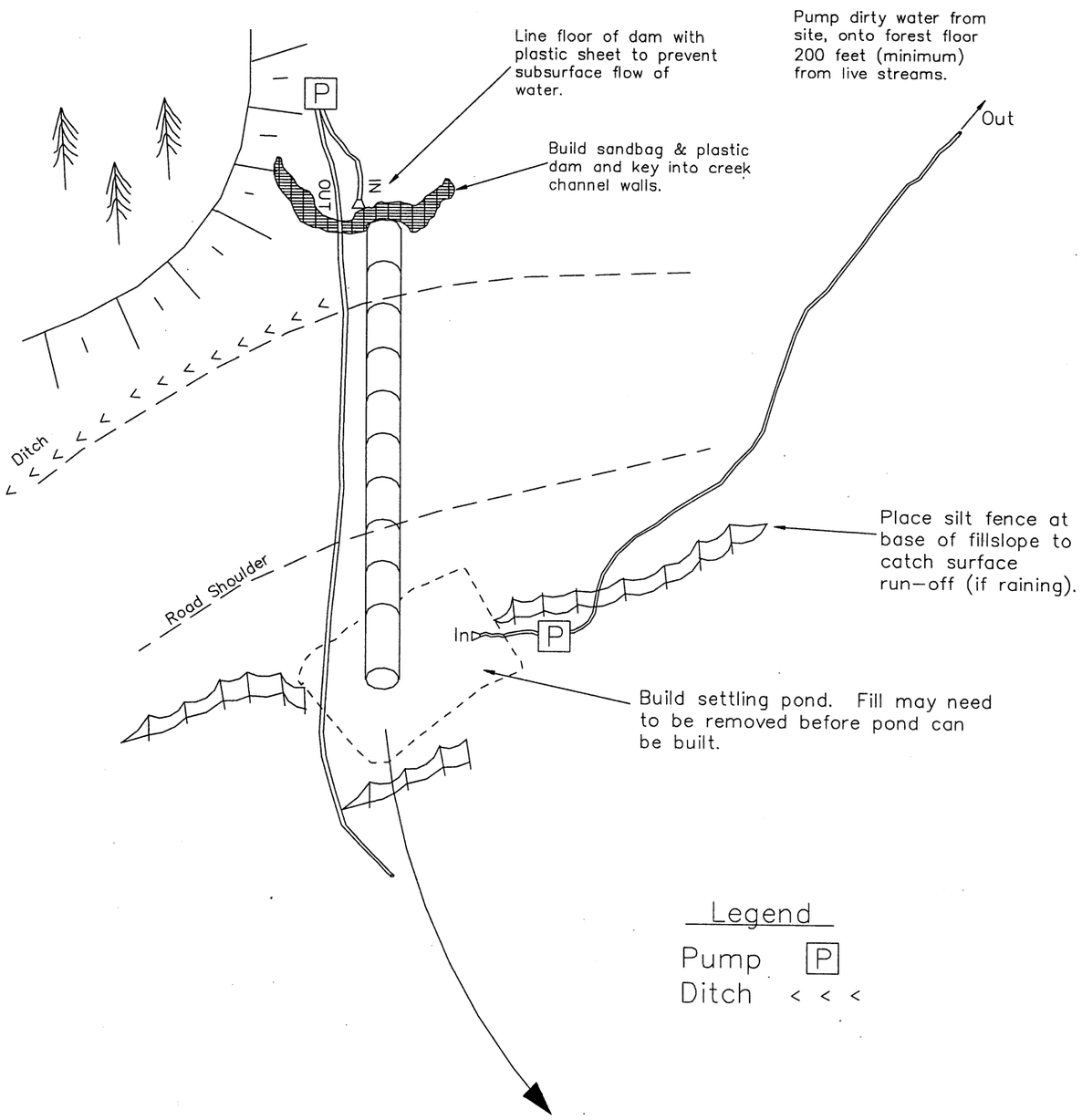


FILL REMOVAL DETAIL



- Remove fill in layers not to exceed 3 feet.
- Channel slopes shall be according to Section 6 – DRAINAGE and the Live Stream Culvert Removal Procedure

SETTLING POND AND PUMP DETAIL

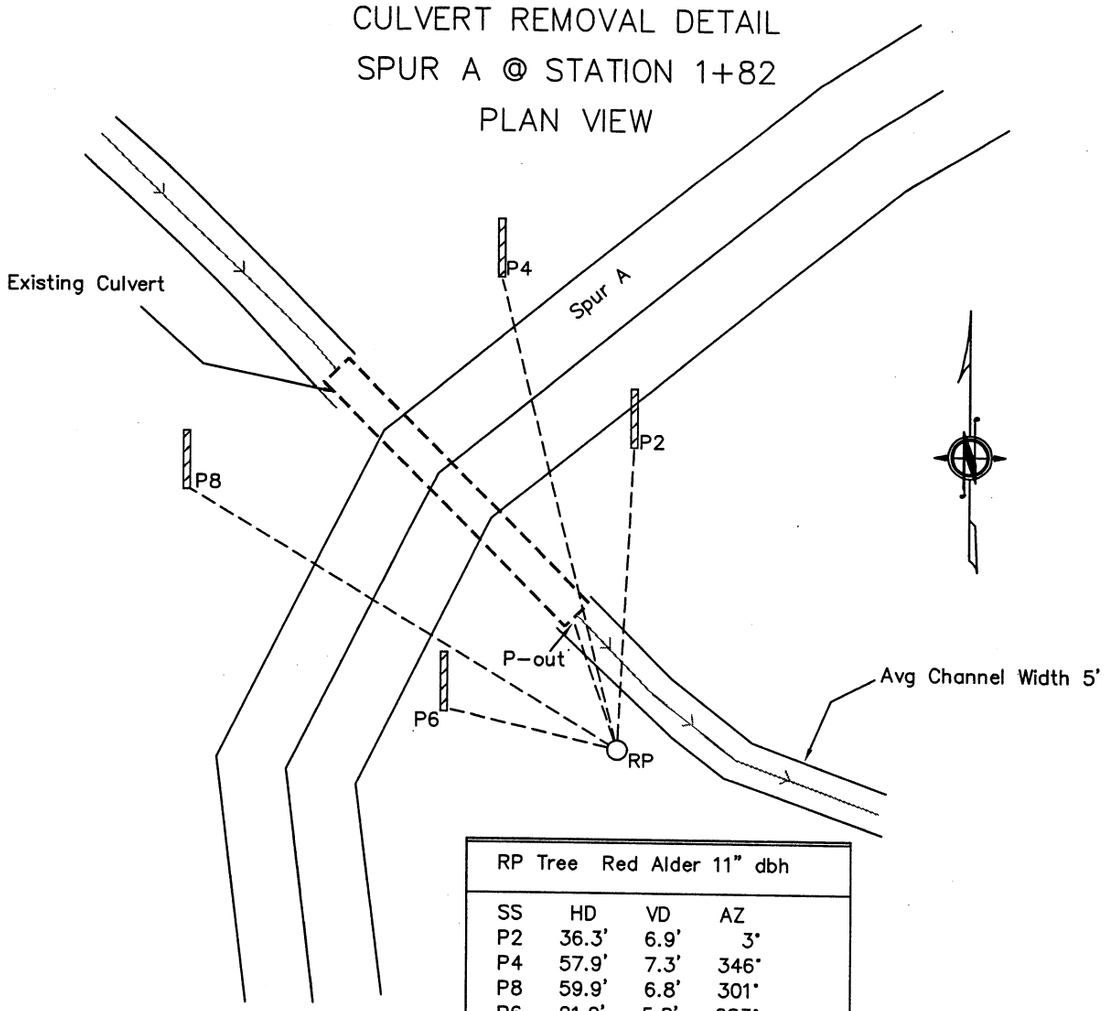


COW TOWN

CULVERT REMOVAL DETAIL

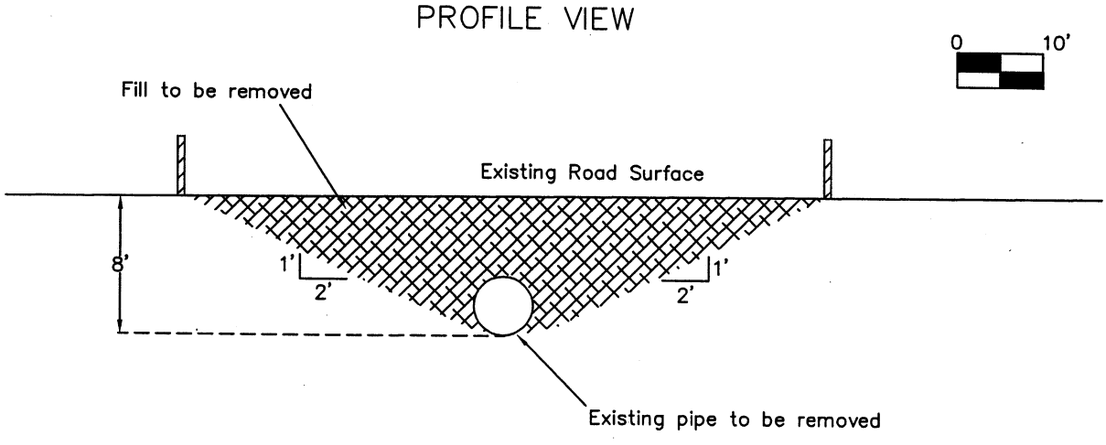
SPUR A @ STATION 1+82

PLAN VIEW



RP Tree Red Alder 11" dbh			
SS	HD	VD	AZ
P2	36.3'	6.9'	3°
P4	57.9'	7.3'	346°
P8	59.9'	6.8'	301°
P6	21.0'	5.8'	283°

PROFILE VIEW



Divert live water before culvert removal.
Use appropriate measures to limit sediment delivery, including but not limited to straw bales, sediment fence, or trash pump.
Remove fill and reshape stream banks to 2:1 slope.
Restore stream channel to original channel gradient.
Place waste material at least 3 feet back from stream banks.
Seed and mulch all exposed soils.

PACIFIC CASCADE REGION - ROAD COST ESTIMATE - CONSTRUCTION

SALE NAME: COW TOWN

CONTRACT NUMBER: 76299

I. CLEARING AND GRUBBING:

Flat Rate -	% Side Slope	MBF/ac	Disposal Factor	Production Factor	Cost/ Station	Width Factor	Total Stations	Sub Total
GM-1100A	35	36	1.00	4.50	$32	0.80	7.60	$876
	40	36	1.00	4.50	$32	0.80	6.00	$691
			1.00	1.00	$10	0.80		$0
			1.00	1.00	$32	0.80		$0
			1.00	1.00	$32	0.80		$0
				1.00				

Clear and Grub TOTAL = $1,567

II. EXCAVATION:

Flat Rate -	% Side Slope	Exc. Type Fact.	Production Factor	Cost/ Station	Width Factor	Total Stations	Sub Total
GM-1100A	35	1.0	3.00	$88	0.80	7.60	$1,605
	40	1.0	4.25	$88	0.80	6.00	$1,795
		1.0	1.00		0.10		$0
		1.0	1.00		0.80		$0
		4.5	1.00	$66	0.50		$0

*End Haul, Over Haul, Large Fills/Cuts

	Estimated Vol. (cy)	No. of Equip. Days	Cost/day	Sub Total
End Haul/ Over Haul				$2,000
Large Fills/ Cuts				$2,000

Excavation TOTAL = $7,400

III. BALLAST AND SURFACING :

Ballast source: GM-1200 Rock Pit
Surface source:
Riprap source :

Description	cu.yds/sta x stations =	cubic yards
Ballast (4"-)	50 16.10	805
Surfacing (2 1/2"-)		0
Riprap		0

UNIT COSTS	Ballast	Surfacing	Riprap
Drill & Shoot		$2.00	
Dig and load	$1.25	$0.75	$1.50
Crushing		$3.50	
Purchase			
Haul *	$2.28	$2.28	$2.28
Spread	$0.80		
Compact	$0.25		
Strip			
Reclamation			
Use tax	$0.08	$0.21	$0.08
TOTAL ($/cy)	$4.66	$8.74	$3.86

* Haul Formula: (R.T.Miles/MPH+Delay)($/hr / Cy/load)

R.T. Miles =	5.3	Ballast (4"-)	805	Cu. yds @	$4.66 /cu. yd =	$3,751
Ave. Speed =	25	Surfacing (2 1/2	0	Cu. yds @	$8.74 /cu. yd =	$0
Delay (Hrs.)**=	0.18	Riprap	0	Cu. yds @	$3.86 /cu. yd =	$0
Cost / Hour =	$64.00					
CY / Load =	11					

** Delay is .11 hr to load and unload & .07hr nonproductive time per hr.

Rock total = $3,751

IV. CULVERTS AND FLUMES:

Description	Qty.	Gauge	Diameter	No/Length	Installed Cost/ft	Sub-total
culvert	2	16	18	30	$12.00	$720
						$0
						$0
						$0
Bands & Gaskets						$0

Culvert total = $720

V. STRUCTURES

Description	Type	Width	Length	Cost/ft.	Sub-total
					$0
					$0
					$0

Structure total = $0

Sub-TOTAL = $13,438

VI. GENERAL EXPENSES:

Overhead & General Exp. Add 10% $1,344

VII. MOBILIZATION:

* Move in costs are averaged over all three sheets.

Description	$ per Move	# of Moves	Sub-total
Dump Trucks	100	4	$400
Grader	400		$0
Compactor	400		$0
Excavator	450	1	$450
Dozer D8)	400	1	$400
Front end loader	400		$0
Rock crusher	$1,500		$0
Drill	$400		$0
Dozer (D5)	$240	1	$240

Total Mobilization = $1,490

Mobilization sub-total = $745

Road No. GM-1100A
Standard: Construction
Stations: 13.60

SHEET TOTAL = $15,527

By: Jim English

Date: 04/30/04

OLYMPIC REGION - ROAD COST ESTIMATE - RECONSTRUCTION

SALE NAME: COW TOWN

CONTRACT NUMBER: 30-076299

I. CLEARING AND GRUBBING:

Flat Rate -	% Side Slope	MBF/ac	Disposal Factor	Production Factor	Cost/ Station	Width Factor	Total Stations	Sub Total
SPUR A Reconst	10	0	1.00	1.00	$20	1	6.17	$123
SPUR A New Const	30	36	1.00	4.50	$32	1	12.29	$1,770
			1.00	1.00	$40	1		$0
			2.00	1.00	$40	1		$0
				1.00	$40	1		
				1.00				

Clear and Grub TOTAL = $1,893

II. EXCAVATION:

Flat Rate -	% Side Slope	Exc. Type Fact.	Production Factor	Cost/ Station	Width Factor	Total Stations	Sub Total
SPUR A Reconst	10	1.0	1.50	$0	1.00	6.17	$0
SPUR A New Const	35	1.0	3.00	$88	0.80	12.29	$2,596
		4.0	1.00	$88	1.00		$0
		4.0	1.00	$88	1.00		$0
			1.00				$0

*End Haul, Over Haul, Large Fills/Cuts

	Estimated Vol. (cy)	No. of Equip. Days	Cost/day	Sub Total
End Haul/ Over Haul	1000	1	$1,000	$1,000
Large Fills/ Cuts		1	$1,000	$1,000

Excavation TOTAL = $4,596

III. BALLAST AND SURFACING :

Ballast source: GM-1200 Rock Pit
Surface source:
Riprap source :

Description	cu.yds/sta	x stations =	cubic yards
Ballast (4"-)	50	15.29	765
Surfacing (2 1/2"-)			0
Riprap			0

UNIT COSTS	Ballast	Surfacing	Riprap
Drill & Shoot			$1.00
Dig and load	$1.25		$2.00
Crushing			$2.00
Purchase			$1.00
Haul *	$2.05	$2.05	$1.00
Spread	$0.80		
Compact	$0.25		
Strip			
Reclamation			
Use tax	$0.08	$0.21	$0.08
TOTAL ($/cy)	$4.35	$1.71	$1.58

* Haul Formula: (R.T.Miles/MPH+Delay)($/hr / Cy/load)

R.T. Miles =	4.3
Ave. Speed =	25
Delay (Hrs.)=	0.18
Cost / Hour =	$64.00
CY / Load =	11

Ballast (4"-)	765	Cu. yds @	$4.35 /cu. yd =	$3,326
Surfacing (2 1/2"	0	Cu. yds @	$1.71 /cu. yd =	$0
Riprap	0	Cu. yds @	$1.58 /cu. yd =	$0

Rock total = $3,326

IV. CULVERTS AND FLUMES:

Description	Qty.	Gauge	Diameter (in.)	No/Length (ft)	Installed Cost/ft	Sub-total
Culvert	2	16	18	30	$12.00	$720
						$0
						$0
Bands & Gaskets						$0

Culvert total = $720

V. STRUCTURES

Description	Type	Width	Length	Cost/ft.	Sub-total
					$0
					$0
					$0

Structure total = $0

Sub-TOTAL = $10,534

VI. GENERAL EXPENSES: Overhead & General Exp. Add 10% $1,053

VII. MOBILIZATION:

* Move in costs are averaged over all three sheets.

Description	$ per Move	# of Moves	Sub-total
Dump Trucks	$100	4	$400
Grader	$400	0	$0
Compactor	$400	0	$0
Excavator	$450	1	$450
Dozer D8)	$400	1	$400
Front end loader	$400	0	$0
Rock crusher	$1,500	0	$0
Dozer (D5)	$240	1	$240

Total Mobilization = $1,490 Mobilization sub-total = $745

Road No. Spur A
Standard: Construction
Stations: 18.46

SHEET TOTAL = $12,333

By: Jim English

Date: 04/30/04

OLYMPIC REGION - ROAD COST ESTIMATE - PRE-HAUL MAINTENANCE

SALE NAME: COW TOWN

CONTRACT NUMBER: 30-076299

Total stations Pre-Haul Maintenance =

I. MISC. MAINTENANCE ITEMS:

	Cost/ Station	Total Stations	Sub Total
mechanical brushing =			$0
hand brushing =			$0
ditch cleaning =			$0
grading =			$0
culvert cleanout =			$0
			$0
			$0
			$0
			$0
			$0
			$0
			$0
			$0
			$0

Misc TOTAL = $0

III. BALLAST AND SURFACING :

Ballast source:
Surface source:
Riprap source :

Description	cu.yds/sta x stations =	cubic yards
Ballast (4"-)		0
Surfacing (2 1/2"-)		0
Riprap		

UNIT COSTS	Ballast	Surfacing	Riprap
Drill & Shoot			
Dig and load			
Crushing			
Purchase			
Haul *	$0.87	$0.87	$0.87
Spread			
Compact			
Strip			
Reclamation			
Use tax	$0.08	$0.21	$0.08
TOTAL ($/cy)	$0.95	$1.08	$0.95

* Haul Formula: (R.T.Miles/MPH+Delay)($/hr / Cy/load)

R.T. Miles =	0.0
Ave. Speed =	25
Delay (Hrs.)=	0.2
Cost / Hour =	$64.00
CY / Load =	11

Ballast (4"-)	0	Cu. yds @	$0.95 /cu. yd =	$0
Surfacing (2 1/2"	0	Cu. yds @	$1.08 /cu. yd =	$0
Riprap	0	Cu. yds @	$0.95 /cu. yd =	$0

Rock total = $0

IV. CULVERTS AND FLUMES:

Description	Qty.	Gauge	Diameter (in.)	No/Length (ft)	Installed Cost/ft	Sub-total
						$0
						$0
						$0
						$0
						$0
Bands & Gaskets						$0

Culvert total = $0

V. STRUCTURES

Description	Type	Width	Length	Cost/ft.	Sub-total
					$0
					$0
					$0

Structure total = $0

Sub-TOTAL = $0

VI. GENERAL EXPENSES:

Overhead & General Exp. Add 12% $0

VII. MOBILIZATION:

* Move in costs are averaged over all three sheets.

Description	$ per Move	# of Moves	Sub-total
Dump Trucks	100	4	$400
Grader	400	0	$0
Compactor	400	0	$0
Excavator	450	1	$450
Dozer D8)	400	1	$400
Front end loader	400	0	$0
Rock crusher	$1,500	0	$0
Dozer (D5)	$240	1	$240

Total Mobilization = $1,490

Mobilization sub-total = $0

Road No. Spur A
Standard: Pre Haul Maintenance
Stations: 0.00

SHEET TOTAL = $0

By: Jim English

Date: 04/30/04

OLYMPIC REGION - ROAD COST ESTIMATE - PRE-HAUL MAINTENANCE

SALE NAME: COW TOWN

CONTRACT NUMBER: 30-076299

Total stations Road Closure =

I. MISC. ROAD CLOSURE COSTS:

	Cost/ Station	Total Stations	Sub Total
water barring =	40.00	32.06	$1,282
ripping =	20.00	32.06	$641
culvert removal =	10.00	32.06	$321
sidecast pullback =			$0
grass seeding =	20.00	32	$641
tank trapping =	50	2	$100
			$0
			$0
			$0
			$0
			$0
			$0
			$0
			$0
			$0

Misc TOTAL = $2,985

VI. GENERAL EXPENSES: Overhead & General Exp. Add 12% $358

VII. MOBILIZATION:

* These move in costs are separate since they will occur after logging is done

Description	$ per Move	# of Moves	Sub-total
Dump Trucks	100		$0
Grader	400		$0
Compactor	400		$0
Excavator	450		$0
Dozer D8)	400		$0
Front end loader	400		$0
Rock crusher	$1,500		$0
Dozer (D5)	$240		$0

Total Mobilization = $0

Road No. Spur A
Standard: Road Closure
Stations: 0.00

SHEET TOTAL = $3,344

By: Jim English

Date: 04/30/04

DEPARTMENT OF NATURAL RESOURCES - PACIFIC CASCADE REGION

FORM 9-87 (rEV. 05-03)

SUMMARY - Road Development Costs
REGION: Pacific Cascade
DISTRICT: Yacolt

SALE / PROJECT NAME: COW TOWN CONTRACT NUMBER: 30-076299

LEGAL DESCRIPTION: Sect 36, T6N R2E; Sect 31, T6N R3E

ROAD NUMBER:		GM-1100A	Spur A	0
ROAD STANDARD:		Construction	Construction	Pre Haul Maintenance
NUMBER OF STATIONS:		13.60	18.46	0.00
SIDESLOPE:		30-40%	10-30%	0
CLEARING AND GRUBBING:		$1,567	$1,893	
EXCAVATION AND FILL:		$7,400	$4,596	
MISC. MAINTENANCE:				$0
ROCK TOTALS (Cu. Yds.):				
Ballast:	1570	$3,751	$3,326	$0
Surface:	0	$0	$0	$0
Riprap:	0	$0	$0	$0
CULVERTS AND FLUMES:		$720	$720	$0
STRUCTURES:		$0	$0	$0
GENERAL EXPENSES:		$1,344	$1,053	$0
MOBILIZATION:		$745	$745	$0
TOTAL COSTS:		$15,527	$12,333	$0
COST PER STATION:		$1,142	$668	#DIV/0!

ROAD DEACTIVATION AND ABANDONMENT COSTS: $3,344

NOTE: This appraisal has no allowance for profit and risk.

TOTAL (All Roads) = **$31,204**

SALE VOLUME MBF = 3,586 * from SEPA

TOTAL COST PER MBF = **$8.70**

Plans to be furnished by:

Compiled by: Jim English Date: 04/30/04

Sheet 1 of 5

Assumed Profit and Risk 15.0% $35,884

TOTAL COST PER MBF = $10.01

DEPARTMENT OF NATURAL RESOURCES - PACIFIC CASCADE REGION

FORM 9-87 (REV. 05-03)

SUMMARY - Road Development Costs
REGION: Pacific Cascade
DISTRICT: Yacolt

SALE / PROJECT NAME: COW TOWN CONTRACT NUMBER: 30-076299

LEGAL DESCRIPTION: Sect 36, T6N R2E; Sect 31, T6N R3E

ROAD NUMBER:		GM-1100A	Spur A	0
ROAD STANDARD:		Construction	Construction	Pre Haul Maintenance
NUMBER OF STATIONS:		13.60	18.46	0.00
SIDESLOPE:		30-40%	10-30%	0
CLEARING AND GRUBBING:		$1,567	$1,893	
EXCAVATION AND FILL:		$7,400	$4,596	
MISC. MAINTENANCE:				$0
ROCK TOTALS (Cu. Yds.):				
Ballast:	1570	$3,751	$3,326	$0
Surface:	0	$0	$0	$0
Riprap:	0	$0	$0	$0
CULVERTS AND FLUMES:		$720	$720	$0
STRUCTURES:		$0	$0	$0
GENERAL EXPENSES:		$1,344	$1,053	$0
MOBILIZATION:		$745	$745	$0
TOTAL COSTS:		$15,527	$12,333	$0
COST PER STATION:		$1,142	$668	#DIV/0!

ROAD DEACTIVATION AND ABANDONMENT COSTS: $3,344

NOTE: This appraisal has no allowance for profit and risk.

TOTAL (All Roads) = **$31,204**

SALE VOLUME MBF = 3,071 * from SEPA

TOTAL COST PER MBF = **$10.16**

Plans to be furnished by:

Compiled by: Jim English Date: 04/30/04

Sheet 1 of 5

Assumed Profit and Risk 15.0% $35,884

TOTAL COST PER MBF = $11.68